REMARKS

Applicant acknowledges the examiner's withdrawal of the species election requirement.

Claim Objections

The examiner objected to Claims 22, 23 and 30 because of informalities. Applicant has amended those claims.

Claim Rejections - 35 U.S.C. §112

The examiner rejected Claims 19 and 24 under 35 U.S.C. 112, second paragraph, as being indefinite. Applicant has amended Claim 19 to depend on claim 11. Applicant has also amended Claim 24.

Claim Rejections - 35 U.S.C. § 102

The examiner rejected Claims 1, 2 and 5-10 under 35 U.S.C. 102(b), as being anticipated by U.S. Publication No, 2001/0049045 (Hockaday). The examiner stated:

> **Hockaday teaches a fuel cartridge comprising a housing 1 with a fuel egress 11 supported by the housing and a multilayer composite vaporization membrane 8 and 9, having a cylindrical shape (figures 1 and 3), disposed about a substantial portion of an interior of the housing, that has a selective permeability to allow vaporization of liquid methanol (paragraph [0052]) (i.e, as recited in claim 5) said cartridge also containing a carbonaceous compound (paragraph [0023]), said membrane comprising silicone or silicone impregnated into fiberglass cloth or polyester film, said membrane further comprising a porous substrate made of polyurethane (paragraph [0050]) (see also paragraphs [0014]-[0056]),**

Applicant's claim 1 is allowable over Hockaday, since the reference neither describes nor suggests, [A] fuel cartridge … including a housing, a fuel egress coupled to the housing to allow contents in the housing to escape from the housing through the fuel egress port and … and a surface area enhanced planar vaporization membrane residing in the fuel cartridge.

Hockaday in contrast discloses a fuel ampoule, which according to Hockaday, is threaded into a fuel cell manifold. Thus, Hockaday does not disclose a fuel cartridge. Moreover,

Hockaday neither describes nor suggests that the cartridge has a fuel egress port coupled to the housing.

In addition, claim 1 also calls for a surface area enhanced planar vaporization membrane .... The examiner considers that this feature is taught by Hockaday as items 8 and 9 in FIGS. 1 and 2. Applicant disagrees. Items 8 and 9 in FIGS. 1 and 2 are the walls of the ampoule[1], not a surface area enhanced planar vaporization membrane that resides in the fuel cartridge.

Claim 2

Claim 2 calls for the surface area enhanced planar vaporization membrane being a polymer membrane that is disposed about a substantial portion of an interior of the housing to provide a high surface area membrane.

Accordingly, to Hockaday, items 8 and 9 are respectively, a porous fiberglass wall that is coated with silicone rubber. Alternatively, both 8 and 9 can be silicone rubber. Therefore, if the examiner contends that items 8 and 9 are the surface area enhanced planar vaporization membrane, then Hockaday does not have the fuel egress port connected to the housing. On the other hand, if 8 and 9 are the egress port, then Hockaday does not have the surface area enhanced planar vaporization membrane. Applicant contends that the only logically reading of Hockaday is as Hockaday discloses namely, that items 8 and 9 are the walls of an ampoule. The walls are designed to allow fuel to enter the fuel cell, and therefore Hockaday has no need nor does Hockaday supply any motivation to provide: "a polymer membrane that is disposed about a substantial portion of an interior of the housing to provide a high surface area membrane."

Claims 5-9 further limit claim 1, and are allowable at least for the reasons discussed in claim 1.

Claim 10

Claim 10 recites that the fuel cartridge of claim 1 has the surface area enhanced planar vaporization membrane enhance "a delivery rate of methanol in a vapor phase to the egress port

[1] Hockaday discloses that: "The ampoule wall 8, 9 may be constructed from pure silicone rubber." Hockaday paragraph [0050].

for a given cartridge size." Hockaday does not describe the fuel egress port and hence cannot describe that "the surface area enhanced planar vaporization membrane enhances a delivery rate of methanol in a vapor phase to the egress port for a given cartridge size." Therefore, Hockaday has no need to nor does Hockaday supply any motivation to modify the disclosed fuel ampoule to provide the claimed fuel egress port.

Claim Rejections - 35 U.S.C. §103

The examiner sets forth the test commonly cited from *Graham v. John Deere Co.*, 383 U.S. 1, 148 U.S.P.Q. 459 (1966) however does not apply or use that test in the rejection.

The examiner rejected Claims 3, 11-20, 22-30, 32 and 33 under 35 U.S.C. 103(a) as being unpatentable over Hockaday in view of U.S. Patent No, 5,069,793 (Kaschemekat).

These claims which are all directed to aspects of the enhanced planar vaporization membrane, e.g., as "a composite membrane comprised of multiple layers of polymer membrane to increase vapor permeation surface area," (claim 3), are allowable over the combination of references.

The examiner uses Kaschemekat to teach: "... a spirally wound multi layer composite membrane comprising a porous substrate (i.e. web), a membrane disposed on a first surface of the substrate (i.e., microporous substrate membrane) and a coating that is a permselective polymer on the other surface of the substrate and said multi layer composite membrane can be a plurality of membranes (column 1, lines 11-52, column 10, lines 33-64 and example 1). ... "

The examiner also contends that it would have been obvious:

> **"...to form a multi layer composite membrane having a porous substrate with a membrane on one side and a methanol-impermeable coating on the opposite surface and then spirally wind said multi layer composite membrane in Hockaday as taught by Kaschemekat, in order to provide a fuel cartridge that will have a higher capacity for methanol storage and improved safety by limiting the amount of methanol that can be leaked out of the container if it should be punctured while at the same time allowing the right amount of fuel through the fuel egress for supply to a fuel cell. It would have also been obvious to provide multiple multi layer composite membrane in Hockaday as taught by Kaschemekat to further increase the capacity for methanol storage and improved safety of the fuel cartridge and also because it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art, St, Regis Paper Co, v, Bemis Co,, 193 USPQ 8. It would have also been obvious to use polyurethane for the membrane in Hockaday**

as taught by Kaschemekat in order to provide a membrane that is properly selected for it specific chemical selectivity and also since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Applicant disagrees that the combination of references is suggested. One motivation offered by the examiner is "...to further increase the capacity for methanol storage and improved safety of the fuel cartridge." However, adding a membrane would not increase the capacity of methanol storage (it occupies space and thus would reduce it). Secondly, arguably Hockaday already offers a more effective safety mechanism than Kaschemekat, namely, open cell foam.[2]

Claim 11, directed to a fuel cartridge including a housing, a fuel egress port supported by the housing and a composite membrane residing in the fuel cartridge including a porous substrate, a polymer membrane disposed over a first surface of the porous substrate and a coating of a methanol-impermeable material disposed over an opposite surface of the substrate, is allowable for analogous reasons given in claims 1 and 3 for instance.

Claims 12-23, which depend directly or indirectly from claim 11 are allowable at least for the reason that they depend from claim 11.

Claim 24 is allowable over the combination of references, since no combination suggests a composite membrane including a porous substrate, a polymer membrane ... and a coating of a methanol-impermeable material disposed over an opposite surface of the substrate. No combination of the references suggests and a coating of a methanol-impermeable material disposed over an opposite surface of the substrate.

Claims 25-33 are allowable at least because they depend from claim 24.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hockaday in view of U.S. Patent No, 5,681,467 hereinafter Solie.

Claim 4 is distinct over Hockaday taken with Solie, since Hockaday, as discussed above, neither describes nor suggests the features of the base claim and Solie does not cure the deficiencies in Hockaday.

---

[2] Hockaday [0050]

The examiner acknowledges that: Hockaday does not teach that the membrane has a series of folds. While Solie teaches a method to form a membrane into a predetermined shape, Applicant contends that like Hockaday, Solie also does not teach that the membrane has a series of folds. Moreover, the combination of Hockaday with Solie, "in order to increase the overall surface area of the membrane to allow more methanol to be released and supplied to the fuel cell." is not suggested, at least because Hockaday is directed to a fuel ampoule not a cartridge and to modify the elements 8 and 9 of Hockaday to provide them as a series of folds would not appear to be workable or at the very least would require additional modification of the fuel cell-ampoule arrangement, as taught by Hockaday, and which the examiner has not addressed.

Claims 21 and 31 were rejected as obvious over Hockaday in view of Kaschemekat as applied to claims 11 and 24 above, and further in view of U.S. Patent No, 6,207,369 (Wohlstadter).

As pointed out above, Hockaday, as modified by Kaschemekat, is not suggested and does not teach the features of the base claims and the addition of Wohlstadter also does not cure the deficiencies in the base combination.

Double Patenting

The examiner provisionally rejected Claims 1-8 and 10 on the ground of non-statutory obviousness type double patenting as being unpatentable over claims 1-6, 8 and 12 of co-pending Application No, 10/664,405. The examiner stated:

> **Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the instant invention fully encompass the scope of the claims in co-pending Application No, 10/664,405; "the only difference is the claims in copending Application No, 10/664,405 further limit the structure by adding either a heating element or a bladder and piston arrangement."**

Claim 1 from the instant case is reproduced below:

> 1. (Currently Amended) A fuel cartridge that supplies a source of fuel to a direct methanol fuel cell, the fuel cartridge comprising:
> a housing;

a fuel egress coupled to the housing to allow contents in the housing to escape from the housing through the fuel egress port; and

a surface area enhanced planar vaporization membrane residing in the fuel cartridge.

Claim 1 from co-pending Application No. 10/664,405 is reproduced below:

1. A fuel cartridge comprising:
a housing ;
a fuel egress port supported by the housing; and
a heat producing element disposed in thermal communication with an interior portion of the housing.

According to the examiner, the purpose of the non-statutory double patenting rejection is "to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees."[3] Since claim 1 of the instant application and claim 1 of the co-pending application require respectively, "a surface area enhanced planar vaporization membrane residing in the fuel cartridge" and "a heat producing element disposed in thermal communication with an interior portion of the housing" no extension of the monopoly of one would be occasioned by the other since the claims are directed to different, non-overlapping subject matter. The examiner has not offered any reasoning why a surface area enhanced planar vaporization membrane residing in the fuel cartridge would render obvious "a heat producing element disposed in thermal communication with an interior portion of the housing," as recited in the co-pending application.

Indeed, even claim 2 of the co-pending application requires: ... a surface area enhanced planar vaporization membrane residing in the fuel cartridge, the surface area enhanced planar vaporization membrane disposed in thermal communication with the heat producing element."

The examiner also provisionally rejected Claims 1-3, 5-8 and 10 on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1, 2, 6-9, 11 and 12 of co-pending Application No, 10/664,818.

[3] Examiner's Action page 7.

According to the examiner: "Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of both applications just use different words to claim the same thing."

Although claims 8-17 of the co-pending application recite "cartridge," those claims will be amended to call for a container, as recited in the base claim 1 and claims 2-7. In contrast, claims of the instant application are directed to a cartridge. The conflicting claims are not identical and are patentably distinct from each other because the claims of both applications are directed to different items.

Nevertheless, applicant will consider filing of a terminal disclaimer in view of application '818, upon an indication of allowable subject matter.

No fee is due. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: 6/26/09

Denis G. Maloney
Reg. No. 29,670

Fish & Richardson P.C.
225 Franklin Street
Boston, MA 02110
Telephone: (617) 542-5070
Facsimile: (617) 542-8906